

cancelled and new claims 36-39 have been added. In addition, the claims have been amended bearing in mind the Examiner's objections and §112 rejections. Also, the drawings and specification have been amended in view of the Examiner's suggestions and remarks. No new matter has been introduced. Reconsideration of the outstanding rejections and withdrawal of the same is respectfully requested in view of the above amendments and the following remarks.

DRAWINGS (Paragraphs 2-4 of the outstanding Office Action)

Paragraph 2

Regarding the objections to the drawings in view of claims 2, 13, and 16, Applicants note that claims 13 and 16 have been cancelled and that a means for generating a vacuum has been included in Figure 1. See the attached Request for Approval to Amend Drawings.

Paragraph 3

Regarding the Examiner's objections to the reference characters in the drawings, Applicants note that the drawings and specification have been amended bearing in mind the Examiner's concerns.

Paragraph 4

Regarding the use of solid black shading areas in the drawings, Applicants kindly refer to the Examiner to the substitute drawings submitted with the Request for Approval to Amend Drawings.

For any and all of the above reasons, withdrawal of the objections to the drawings is respectfully requested.

SPECIFICATION (paragraph 5 of the outstanding Office Action)

Paragraph 5

Applicant notes that the specification has been amended in accordance with the Examiner's suggestions and withdrawal of the objections to the specification is respectfully requested.

CLAIMS (paragraphs 6-24 of the outstanding Office Action)

Paragraph 6

Applicant notes that claim 9 has been cancelled and that claim 14 has been amended pursuant to the Examiner's suggestion.

Paragraph 7

Applicants have attached hereto a list of the claims as originally filed with lines one and one-half spaced.

Paragraph 8

The claims have been reviewed and revised bearing in mind the examiner's concerns and it is respectfully submitted that all claims, as amended, are in full compliance with 35 U.S.C. §112.

Paragraphs 9-16

The present invention relates to an apparatus for the separation of waste constituents from matrices, wherein the apparatus comprises a vessel for receiving matrices and a manifold for removal of gases emerging from said matrices. Furthermore, the manifold is placed on top of the vessel.

In paragraph 9 of the outstanding Office Action, the Examiner rejects claims 1-4 and 17-18 as being anticipated by primary reference Weyand *et al.* (U.S. Patent 5,300,137). The Examiner refers to reference numerals 8 and 10 in Weyand *et al.* as allegedly representing a "vessel" and a "manifold" respectively, and contends that this reference teaches all elements of the present invention. However, even if, *in arguendo*, reference numerals 8 and 10 in Weyand *et al.* could be considered a vessel and a manifold, this reference is still absent any teaching of placing the manifold on top of the vessel. Accordingly, the present invention is not anticipated by Weyand *et al.*

Because the secondary references listed in paragraphs 10-16 of the outstanding Office Action do not overcome the shortcomings in Weyand *et al.*, the rejections set forth in these paragraphs 10-16 should similarly be withdrawn.

Paragraphs 17-24

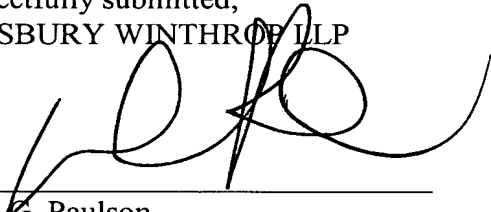
In paragraphs 17-24 of the outstanding Office Action, the Examiner rejects the claims for obviousness-type double patenting over U.S. Patent 5,127,343, either alone (paragraph 17) or in combination with secondary references (paragraphs 18-24). In this regard, Applicants note that U.S. Patent 5,127,343 has been reissued as Re 36,222. Accordingly, it is believed that double-patenting rejections, if any, should have been made over Re 36,222 and withdrawal of the rejections over U.S. Patent 5,127,343 is respectfully requested.

For any and all of the above reasons, it is respectfully submitted that the present invention is patentable over the cited art.

CONCLUSION

Because all rejections and objections have been addressed and overcome, it is respectfully submitted that the present application is in condition for allowance and a Notice to that effect is earnestly solicited. If any questions remain, the Examiner is encouraged to call the undersigned attorney to expedite the prosecution of this application.

Respectfully submitted,
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Enclosure: Appendix

APPENDIX TO SHOW CHANGES MADE

IN THE SPECIFICATION

On page 8, lines 3-9 have been deleted and substituted with:

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The Matrix Constituent Separator (MCS) provides a controlled air flow distribution which the prior art lacked. The Matrix Constituent Separator enables an even distribution of air flow and heat drawn through the matrices contained in either the static or agitator tray to ensure complete desorption of the constituents contained within the entire matrix volume. For the desorption of volatile and semi-volatile organic and volatile inorganic chemicals, the lack of moving parts in the treatment chamber affords low maintenance and thus provides increased production and associated economical benefits.

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The section of the specification starting on page 11 with "Figure 2:" and ending on page 14 with "38. Soil treatment tray." has been deleted and substituted with:

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Figure 1:

29. Process Burner

30. Radiant tube emitter

31. Combustion Exhaust Vents

32. Heater Base Assembly

33. High temperature silicone gasket material which seals exhaust manifold to tray
top edge.

34. 1 to 100 micron filter media and support frame which acts as a physical barrier to stop
particulates from exiting the system in the air stream.

35. Air extraction manifold

36. Hydraulic cylinder for lifting exhaust manifold.

37. Exhaust gas outlet.

38. Soil treatment tray.

39. Means for generating a vacuum.

Figure 2:

1. Shaft support beam which houses the bearing and shaft that is connected to the matrix mixing flights.
2. Slotted screened bottom of tray which contains the contaminated matrices during processing.
3. Mixing flight which moves through matrix contained in tray to facilitate mixing of matrices during processing.
4. Hydraulic motor which drives mixing flights.
5. Slave sprocket which reduces power requirements and drives flights.
6. Drive chain which connects slave sprocket to drive sprocket.
7. Drive sprocket which is coupled to hydraulic motor for driving mixing flights.
8. Protective housing to keep hydraulic motor from hostile environments.
- [9. Hydraulic motor which drives mixing flights.**
- 10. Drive sprocket which is coupled to hydraulic motor for driving mixing flights.**
- 11. Drive chain which connects slave sprocket to drive sprocket.**
- 12. Slave sprocket which reduces power requirements and drives flights.**
- 13. Slotted screened bottom of tray which contains the contaminated matrices during processing.]**
14. Agitator tray used to process matrices prior to, during and after introduction of chemical additives to enable treatment of certain inorganic contaminants.
- [15. Mixing flight which moves through matrix contained in tray to facilitate mixing of matrices during processing.]**
16. High temperature support bearing which allows slave shaft to rotate.
17. Central drive shaft in which flights are attached.

Figure 3:

- [18]2. Slotted screened bottom of tray which contains the contaminated matrices during processing.**
19. Hinge to dump gate for matrix removal following treatment.
20. Dump gate door which swings open to dump matrices.
21. Dump gate latch which prevents gate from opening during treatment.
22. Forklift pick-up pocket enables the forklift to move, load, unload and dump trays.

- [23. Dump gate latch which prevents gate from opening during treatment.
- 24. Hinge to dump gate for matrix removal following treatment.
- 25. Forklift pick-up pocket enables the forklift to move, load, unload and dump trays.
- 26. Slotted screened bottom of tray which contains the contaminated matrices during processing.]
- 27. Bottom screen support to support weight of matrix loaded into trays.
- [28. Forklift pick-up pocket enables the forklift to move, load, unload and dump trays.
- 28a. Forklift pick-up pocket enables the forklift to move, load, unload and dump trays.

Figure 1:

- 29. Process Burner
- 30. Radiant tube emitter
- 31. Combustion Exhaust Vents
- 32. Heater Base Assembly
- 33. High temperature silicone gasket material which seals exhaust manifold to tray top edge.
- 34. 1 to 100 micron filter media and support frame which acts as a physical barrier to stop particulates from exiting the system in the air stream.
- 35. Air extraction manifold
- 36. Hydraulic cylinder for lifting exhaust manifold.
- 37. Exhaust gas outlet.
- 38. Soil treatment tray.]

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IN THE CLAIMS

Claims 4, 9, 13, 16, and 20-35 have been cancelled.

Claims 36-39 have been added.

Claims have been amended as follows:

1. (Amended) An apparatus for the separation of waste constituents from matrices, comprising:

- (i) a vessel **[having a top, said top]** having an interior for receiving matrices;
- (ii) a manifold for removal of gases emerging from said matrices, said manifold being positioned on top of said vessel; and
- (iii) a means for heating **[interior]** said interior.

2. (Amended) The apparatus of claim 1, further comprising a means for generating a vacuum for withdrawing said gases through said manifold, said means for generating a vacuum being connected to said manifold.

3. (Amended) The apparatus of claim 2, wherein said vessel comprises one or more **[further comprising a]** removable trays.

5. (Amended) The apparatus of claim **[4]** 3, wherein said vessel has **[0 sides and the]** a bottom part and peripheral sidewalls extending therefrom, each of said peripheral sidewalls being at least partly defined by said one or more removable trays **[effectively forms the sides of the vessel upon insertion into said vessel]**.

6. (Amended) The apparatus of claim 3, wherein said one or more removable trays comprise[s] a bottom **[having]** part and peripheral sidewalls extending therefrom, said bottom part being structured so as to define orifices in said bottom part, and said bottom part being capable of supporting said matrices **[and allowing air to pass upwardly through matrices and orifices]**.

7. (Amended) The apparatus of claim 6 wherein said bottom part is a screen.

8. (Amended) The apparatus of claim 6 wherein said bottom part is slotted.

10. (Amended) The apparatus of claim 3, wherein said trays **[is loaded with matrices from top and has]** have a loading capacity of at least about 2.5 cubic yards.

11. (Amended) The apparatus of claim 3, wherein said one or more removable trays **[has a hinged gate at opposite end of]** have fork lift pockets **[for unloading treated matrix]**.

12. (Amended) The apparatus of claim 1, further comprising a means for mechanically agitating matrices, said means for mechanically agitating being positioned in said interior and connected to said vessel.

14. (Amended) The apparatus of claim 1, wherein said manifold comprises **[bottom surface of manifold comprises]** a **[high temperature silicon or other]** heat resistant gasket **[to seal tray to manifold so that air is substantially directed through trays and matrices contained in tray and not around tray]** touching said vessel.

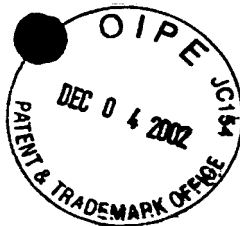
15. (Amended) The apparatus of claim 1, wherein said manifold contains a 1 to 100 micron dry filter **[media physically separating matrix particles entrained in the purge gas air stream].**

17. (Amended) The apparatus of claim 3, comprising between 1 and 4 of said removable trays.

18. (Amended) The apparatus of claim 1, wherein said apparatus is permanently mounted **[or mobile].**

19. (Amended) The apparatus of claim 1 wherein said **[top can be moved vertically]** manifold is not attached to said vessel.

END OF APPENDIX



I Claim:

1. An apparatus for the separation of waste constituents from matrices, comprising:
a vessel having a top, said top having a manifold for removal of gases; a bottom;
and a means for heating interior of said vessel.
2. The apparatus of claim 1 further comprising a means for generating a vacuum for
withdrawing gases through said manifold.
3. The apparatus of claim 2 further comprising a removable tray.
4. The apparatus of claim 3 wherein said vessel further comprises 0 to 4 sides.
5. The apparatus of claim 4 wherein said vessel has 0 sides and the tray effectively
forms the sides of the vessel upon insertion into said vessel.
6. The apparatus of claim 3 wherein said tray comprises a bottom having orifices,
said bottom capable of supporting matrices and allowing air to pass upwardly
through matrices and orifices.
7. The apparatus of claim 6 wherein said bottom is a screen.
8. The apparatus of claim 6 wherein said bottom is slotted.
9. The apparatus of claim 3 wherein said tray is of size, dimension and capacity so that
it can be moved and loaded into vessel with a fork truck.
10. The apparatus of claim 3 wherein said tray is loaded with matrices from top and has a
loading capacity of at least about 2.5 cubic yards.
11. The apparatus of claim 3 wherein said tray has a hinged gate at opposite end of fork
lift pockets for unloading treated matrix.

12. The apparatus of claim 1 further comprising a means for mechanically agitating matrices.
13. The apparatus of claim 1 further comprising a means for the introduction of chemical treatment additives.
14. The apparatus of claim 1 wherein bottom surface of manifold comprises a high temperature silicon or other heat resistant gasket to seal tray to manifold so that air is substantially directed through trays and matrices contained in tray and not around tray.
15. The apparatus of claim 1 wherein said manifold contains a 1 to 100 micron dry filter media physically separating matrix particles entrained in the purge gas air stream.
16. The apparatus of claim 1 further comprising a means for remotely monitoring operation of said apparatus using a controller system and transducers to convey information to a computer.
17. The apparatus of claim 3 comprising between 1 and 4 trays.
18. The apparatus of claim 1 wherein said apparatus is permanently mounted or mobile.
19. The apparatus of claim 1 wherein said top can be moved vertically.
20. A method for the separation of hazardous and non-hazardous organic and inorganic waste constituents from matrices comprising: placing matrices in a container; heating matrices; creating a subatmospheric pressure within the matrices by establishing a vacuum above the matrices; and removing the gaseous constituents from the matrices.
21. The method of claim 20 herein said matrices are selected from radioactive materials, industrial process waste streams, soils, sludges, activated carbon, catalyst, aggregates, biomass, debris, sorbents, drilling mud and drill cuttings.

22. The method of claim 20 wherein boiling points of said constituents range from about 30 degrees Fahrenheit to about 1600 degrees Fahrenheit.
23. The method of claim 20 wherein said constituents are selected from ammonia, mercury, mercuric compounds, cyanide, cyanide compounds, arsenic, arsenic compounds, selenium, selenium compounds, and other metals and their salts.
24. The method of claim 20 further comprising the separation of constituents from matrices in which constituents are not thermally destroyed or combusted.
25. The method of claim 20 further comprising reversibly phase changing constituents separated from matrix by condensation of or physical filtration or adsorption of constituents.
26. The method of claim 20 wherein constituents are retained in matrices for less than 0.5 seconds after desorption temperature of constituents has been achieved.
27. The method of claim 20 further comprising heating matrices in an indirect manner by exposure to light energy with an emission spectrum between 0.2 to 14 microns.
28. The method of claim 20 wherein the surface of matrices exposed to infrared energy becomes secondary emitter and purge air convectively transfers heat to matrix surface of loaded tray.
29. The method of claim 20 wherein surface of matrices exposed to light energy becomes emitter and transfers heat conductively to matrix layers above surfaces exposed to light energy.
30. The method of claim 20 wherein matrices heated by convective means conducts heat to matrix layers above surface of matrix.
31. The method of claim 20 further comprising separating organic chemicals from matrices containing radionuclides and inorganic metallic constituents.

32. The method of claim 20 wherein said vacuum ranges from 0 inches mercury to about 29 inches mercury.
33. The method of claim 20 further comprising means for recovery of constituents which can be refined for recycling purposes.
34. The method of claim 20 further comprising means for purging gas vapors and constituents to be condensed and collected.
35. The method of claim 20 wherein discharge air stream is recirculated below trays to form a substantially closed loop system.